

The University of Chicago

THE SCIENTIFIC
SOURCES OF GOLDSMITH'S
ANIMATED NATURE

A PART OF A DISSERTATION SUBMITTED TO
THE FACULTY OF THE DIVISION OF THE
HUMANITIES IN CANDIDACY FOR THE
DEGREE OF DOCTOR OF PHILOSOPHY

DEPARTMENT OF ENGLISH LANGUAGE AND LITERATURE

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The versatile genius of Goldsmith produced top-ranking works in the poetry, drama, novels, and essays of the eighteenth century. But Goldsmith was also a compiler in the field of science. His *History of the Earth and Animated Nature*,¹ a compilation of natural history in eight volumes, and his *Survey of Experimental Philosophy*,² a compilation of physical science in two volumes, represent his major quasi-scientific works, quasi-scientific because the works are popularized science.

The present essay is an interpretation of Goldsmith's interests as a popular natural historian with particular emphasis upon his handling of scientific sources. It includes a modification of some of the conclusions set forth by James Hall Pitman in his study, *Goldsmith's Animated Nature*.³ Pitman's study has been the most comprehensive investigation of the sources, attitudes, and methods of Goldsmith in natural history. But some of his conclusions do not seem to be supported by sufficient facts, and consequently give a misleading impression of Goldsmith as a popularizer of natural science.

Pitman's study of the sources which Goldsmith used for *Animated Nature* is of questionable value. The appendix to his study, with its long list of sources, "intended to contain only works which Goldsmith knew directly"⁴ includes no verifications of borrowings. Pitman merely lists, by volume and page, Goldsmith's own allusions to sources. He recognized and stated quite clearly the difficulties inherent in the problem of determining Goldsmith's first-hand sources.⁵ But he did not solve the problem completely. He

¹ London, 1774.

² London, 1776.

³ "Yale Studies in English," Vol. LXVI; New Haven, 1924.

⁴ Pitman, *op. cit.*, p. 137, n. 1.

⁵ *Ibidem*. "As I have explained above, Chapter II, it is often almost impossible to say whether Goldsmith's citations are at first or second hand." See also p. 83, where Pitman gives a quotation showing Buffon quoting from sources which Goldsmith also used.

notes,⁶ for example, that Goldsmith's description of the Pigtail Baboon in *Animated Nature*⁷ was drawn from the work of George Edwards, *The Natural History of Uncommon Birds*.⁸ But he does not state where in Edwards the passage occurs. In reality, Goldsmith borrowed the passage from Buffon's *Histoire Naturelle*,⁹

⁶ *Op. cit.*, p. 140. See the first reference under Edwards.

⁷ IV, 215-16.

⁸ London. 1743-51.

⁹ Georges Louis LeClerc, Comte de Buffon, *Histoire Naturelle* (52 vols.; Paris, 1785-1791), VII, 112-13. The text of Buffon which Goldsmith used was not the first edition in quarto, published in forty-four volumes between 1749 and 1804. Goldsmith could have used the first seventeen quarto volumes, which were published before his death; the fifteen volumes on the earth, man, and quadrupeds, which were published between 1749 and 1767, and the first two volumes on birds, published between 1770 and 1774. But Goldsmith's volume and page references to Buffon indicate that he did not use the quarto edition. For the description of the Cricetus or German rat, occurring in *Animated Nature*, IV, 82, he refers to "Buffon, vol. XXVI, p. 159." In the quarto edition, the history of quadrupeds concludes with Volume XV. Obviously, Goldsmith must have used an edition which came in double the number of volumes of the quarto edition. Pitman arrived at the same conclusion, but did not pursue the question. On page 38, he writes: "At 4:27 [*Animated Nature*], for example, we find the footnote: 'Buffon, vol. XXI, p. 212,' but the place in the first edition of Buffon where the animal in question—the marmose—is discussed is in volume ten, and I know of no edition Goldsmith might have used which more than doubles the number of volumes of the original. It could not have been a translation, because there was none in Goldsmith's lifetime. Nevertheless—for the references are consistent—Goldsmith's edition of the History of Quadrupeds was in at least thirty volumes. . . ."

But there was an edition in at least thirty volumes which Goldsmith might have used and which he probably did use, according to the evidence. The catalogue of the Bibliothèque Nationale lists a duodecimo edition of thirty-one volumes in thirty-two, published between 1762 and 1768. The entry reads: *Histoire naturelle générale et particulière (theorie de la terre, histoire naturelle de l'homme et des animaux quadrupèdes)*. Paris—Imp. Royal, 1762-1768. 31 tomes in 32 vols. dont un de tables.

The assumption that Goldsmith probably used this edition is based on one specific fact. In the duodecimo edition of Buffon at the John Crerar Library in Chicago, a set published in fifty-two volumes between 1785 and 1791, a cross-reference checks with one of Goldsmith's references. Under the description of the stag in volume II, page 46, there is a note: "Voyez la description de la tête du cerf dans les différens ages, tome XI de l'édition en 31 volumes." In *Animated Nature*, III, 98, when Goldsmith describes the horns of the stag at different ages, he gives a reference to

from the text and a Latin footnote, where Buffon quotes Edwards by name. Since Goldsmith was using Buffon constantly,¹⁰ the probability is great that the borrowing from Edwards was second-hand. Although the problem of authentic sources is difficult, some second-hand sources can be eliminated.

Pitman divided the sources of *Animated Nature* into three classes, defining them as follows:

In general, the authentic sources are of three kinds: first, works like those of Linnaeus, Gesner, or Boyle, whose object is purely scientific, or like Buffon's, which aims to combine science with elegant amusement; secondly, travels and voyages, which, though their purpose is not primarily scientific, yet contain much description of animals and of natural phenomena; and thirdly, the ancient writers, who serve to provide embellishing details and anecdotes, rather than scientific information.¹¹

Pitman seems to have overestimated the "purely scientific" contributions in *Animated Nature*. The first part of this essay is an attempt to modify Pitman's conclusions regarding Goldsmith's use of those works "whose object is purely scientific," and to present the sources which seem to displace those purely scientific works. The second part of this essay is an attempt to establish Goldsmith's direct indebtedness to purely scientific sources.

I

In his chapter on the sources of *Animated Nature*,¹² Pitman discusses all the sources, the ancient writers, the literary references, the books of travels, and the scientific sources. The scientific sources are naturally the most important qualitatively as well as quantitatively, and the present essay is concerned solely with them. In considering the purely scientific sources (and thus excluding

"Buffon, vol. XI, p. 113." Under the circumstances, it is very possible that Goldsmith used the duodecimo edition of Buffon, covering the earth, man, and quadrupeds, and appearing between 1762 and 1768 in thirty-one volumes.

¹⁰ Buffon was the chief, though not the sole, source of the first four volumes of *Animated Nature*. See Pitman's discussion *op. cit.*, pp. 37-46, 65-70, 78-85. See also A. L. Sells' *Les Sources Françaises de Goldsmith* (Paris, 1924), pp. 179-82. In the present essay, Buffon has been excluded from the discussion of sources.

¹¹ Pitman, *op. cit.*, pp. 19-20.

¹² Pitman, *op. cit.*, pp. 18-62.

Buffon),¹³ Pitman presents as major contributors, the names of seven scientists whose works were available in Goldsmith's day. He states his conclusion succinctly.

Excluding Buffon, since his book is a work of mixed *genre*, we find that Goldsmith's principal scientific sources were Gesner,¹⁴ Swammerdam,¹⁵ Willughby,¹⁶ Ray,¹⁷ Brisson,¹⁸ Linnaeus,¹⁹ and Réaumur,²⁰ with a number of others of less importance.²¹

Pitman does not give the verifications of borrowings which would indicate to what extent these men served as "principal" scientific sources. But in his discussion he cites Brisson as "the chief source of Goldsmith's knowledge of birds"²² and Réaumur and Swammerdam as the two main sources of the knowledge of insects.²³ The material in over two volumes of *Animated Nature* is thus accredited chiefly to learned scientists.

If the other four purely scientific sources of Pitman are "principal" in the same degree that Brisson, Réaumur, and Swammerdam are emphasized as being, then a large amount of *Animated*

¹³ Buffon is excluded from this essay partly because Pitman excludes Buffon from his discussion of those sources whose object is purely scientific. Pitman defines Buffon as a "work of mixed *genre*," in which Buffon combines "science with elegant amusement." (See Pitman, *op. cit.*, pp. 19, 29.) The present essay is concerned with the authentic, purely scientific sources of *Animated Nature*.

¹⁴ Konrad von Gesner, *Historia animalium* (4 vols.; Zurich, 1556-87). See Pitman, p. 140.

¹⁵ Jan Swammerdam, *Historia Insectorum Generalis* (Amsterdam, 1685). See Pitman, p. 145.

¹⁶ Francis Willughby, *Ornithology* (London, 1678). See Pitman, p. 146.

¹⁷ John Ray, *Synopsis Methodica Animalium Quadrupedum et Serpentinum Generis* (London, 1693) and *Synopsis Methodica Avium et Piscium* (London, 1713). See Pitman, p. 144.

¹⁸ Mathurin Jacques Brisson, *Ornithologie* (6 vols.; Paris, 1760). See Pitman, p. 138.

¹⁹ Carolus Linnaeus, *Systema Naturae per Regna Tria* (Leyden, 1735) and *Amoenitates Academicæ, seu Dissertationes Variæ Physicæ, Medicæ, Botanicæ* (10 vols.; Leyden, 1749) and *Animalium Specierum . . . Methodica Dispositio* (Leyden, 1759). See Pitman, pp. 142-3.

²⁰ René Antoine Ferchault de Réaumur, *Mémoires pour servir à l'Histoire des Insectes* (Paris, 1734-42) and *The Natural History of Bees* (London, 1744), a partial translation. See Pitman, p. 144.

²¹ Pitman, *op. cit.*, p. 29.

²² Pitman, *op. cit.*, p. 35.

²³ *Ibid.*, pp. 30, 31.

Nature is to be credited to purely scientific sources. The importance of the purely scientific source in *Animated Nature* is again expressed by Pitman, when he writes of the scientists in his list as follows: "Linnaeus, Ray, Willughby, and the rest, provide him [Goldsmith] more or less with a framework and with multitudinous details. . . ." ²⁴

With the exception, perhaps, of Gesner, the seven scientists in Pitman's list are some of the greatest the world has ever known. One would like to think that to his literary interests Goldsmith added a profound scientific interest and knowledge and that he displayed this interest and knowledge in the handling of these sources in his natural history. But Goldsmith was not a learned scientist, and purely scientific works do not contribute nearly so much to *Animated Nature* as do popular works. It is true that Goldsmith borrowed *some* material from all of these seven scientists, but not to such an extent that *any* of them, with the exception of Willughby, can stand as a principal scientific source.

The actual principal scientific sources of *Animated Nature* (always excluding Buffon) are four: the *Ornithology* of Francis Willughby; *La Spectacle de la Nature* by the Abbé Antoine Noël Pluche; ²⁵ *British Zoölogy*, ascribed to T. Pennant; ²⁶ and the *New and Accurate System of Natural History* by R. Brookes. ²⁷ My verifications of these sources are contained in the appendix to this essay. With the exception of Willughby, none of these writers is an eminent scientist, nor is the work a learned scientific work.

Since Pitman has already mentioned Willughby as a main source (although without adequate verification), Willughby can be dispensed with quickly. Pioneer ornithologist though he was, Willughby is far more entertaining and far better adapted to Goldsmith's purposes than is the work of Brisson, whom Pitman claims as a main source of birds. ²⁸ An examination of the borrowings

²⁴ *Ibid.*, p. 29. This statement does not seem to be supported by the facts. The framework of *Animated Nature*, the chain of being, came to Goldsmith through Buffon's *Histoire Naturelle*. A comparison of Buffon's theory of the chain of being and Goldsmith's theory—and practice—of the chain is very illuminating. The "multitudinous details" of *Animated Nature* can be traced chiefly to popularized science.

²⁵ Eight vols.; Paris, 1732-51.

²⁶ Four vols.; London. 1768-70.

²⁷ Six vols.; London, 1763.

²⁸ Pitman, *op. cit.*, p. 138.

from Willughby will also show that Goldsmith used popular material on birds which he could not have obtained from Brisson.²⁹

La Spectacle de la Nature was one of the most popular quasi-scientific works published in the eighteenth century.³⁰ Its dialogue form, its enthusiastic appreciation of the argument from design, its informal style, its mixture of anecdote and entertaining incident make it delightful reading. Although Goldsmith referred to Pluche by name in *Animated Nature*³¹ and although the work existed in translation in Goldsmith's library,³² Pitman did not identify the work³³ and did not therefore examine it. Yet one long borrowing in *Animated Nature*³⁴ on the beaver's dam, taken from *Pluche*,³⁵ is longer than the complete list of borrowings from Brisson.

The third major source, *British Zoölogy*, is itself a compilation. It is confined to the natural history of the birds, beasts, and fish of Britain. Like Pluche, the author has an easy, informal style. Like Pluche, he enlivens the account with historical information

²⁹ See below, pp. 55-57.

³⁰ When Daniel Mornet investigated the catalogues of five hundred private libraries of the bourgeoisie in the eighteenth century in France, Pluche's *La Spectacle de la Nature* outstripped the works of Buffon, Voltaire, and Rousseau. *La Spectacle de la Nature* appeared 206 times in these catalogues, Buffon's *Histoire Naturelle*, 202 times, Voltaire's *Oeuvres*, 173 times, and Rousseau's *Nouvelle Héloïse*, 165 times. See Daniel Mornet, *Les Sciences de la Nature en France au XVIII^e Siècle* (Paris, 1911), p. 9. Its popularity in England may be seen in the fact that the English translation occurred in 1733, almost immediately after the first Paris edition, and went into an eighth edition between 1754-63.

³¹ V, 182.

³² Goldsmith's library contained what was probably the eighth edition of Pluche in translation, a seven volume duodecimo edition, published between 1754 and 1763. The entry in the catalogue of Goldsmith's library reads: "Nature Displayed, 7 vols. 1757." I could not secure Pluche in the original Paris edition, since it apparently is not in any library in the United States. Goldsmith, moreover, seems to have used a translation. I could not secure the translation which he probably used, since this edition is in the British Museum, and I was forced to use a translation by D. Bellamy, entitled *Nature Delineated*, and published in four volumes in London in 1739. The phraseology of this translation, however, is very close to the phraseology of Goldsmith in his borrowings from Pluche. The catalogue of Goldsmith's library is published in James Prior's *The Life of Oliver Goldsmith, M. B.* (2 vols.; London, 1837), Appendix, Vol. II.

³³ Pitman, *op. cit.*, pp. 149-50.

³⁴ IV, 161-67.

³⁵ *Nature Delineated*, I, 248-52.

and anecdote. Unfortunately, Pitman was not able to examine this source.³⁶ But the borrowings from *British Zoölogy* exceed those of Swammerdam, Réaumur, Brisson, and Ray put together.

The fourth major source, R. Brookes' *A New and Accurate System of Natural History*, has little appeal. Its confusion alone makes it difficult reading. It is organized like a dictionary but without even an alphabetical clue to its contents. It has no controlling interest like the teleological interest of Pluche and Penant. The style is dull. Such entertaining material as it does contain must be painstakingly picked from confused passages of anatomical description. The work is known today only because Goldsmith wrote the introductions for the first edition in 1763. It is doubtful that Goldsmith himself would have used the work except for the fact that he had become acquainted with it in 1763. But use it he did, and extensively. It is safe to say that Goldsmith borrowed more scientific material from Brookes than he did from the entire list of scientists whom Pitman claimed as principal scientific sources of *Animated Nature*.

Pitman examined Brookes but he dismissed him as unimportant. In the opening paragraph of his discussion of sources, Pitman writes:

I examined Brookes' work, suspecting that it must have had a considerable influence upon *Animated Nature*, but found practically no relation between the two. The plan of Brookes, except for the larger divisions,³⁷

³⁶ Pitman, *op. cit.*, 138-39.

³⁷ By the larger divisions, Pitman may mean that Goldsmith discusses in order (1) quadrupeds, (2) birds, (3) fish, (4) reptiles, and (5) insects, and that these are the divisions and the order of the volumes of Brookes. This order and division might have occurred to anyone. Nevertheless, this is not the order of Pliny, Buffon, or Pluche, to mention three comprehensive natural historians with whom Goldsmith was familiar. Brookes' work, in fact, is the only one of the major sources of *Animated Nature* the order of whose major divisions is similar to that of Goldsmith.

But the similarity goes further. An examination of the tables of contents for each of the first three volumes of Brookes' work will indicate similarities between Brookes' lists and Brookes' order and the lists and order of *Animated Nature*. In Volume I, for example, Chapters I to XVI, with some omissions, parallel Goldsmith's list of well-defined species of quadrupeds (*Animated Nature*, II, 431-IV, 115). The similarity is seen best in the tables of contents of Goldsmith's volumes, listing the Horse Kind, the Cow Kind, the Sheep and Goat Kind, etc. If Chapters IX to XII are omitted in Brookes, the list of quadrupeds is the same as Gold-

is utterly different from that of Goldsmith. The pictures of the earlier work, which I thought, before seeing them, might have suggested those in *Animated Nature*, have no resemblance to Goldsmith's. Goldsmith did not even use Brookes' facts, for he mentions him only thrice by name, and of these references, one is cited only to be refuted.³⁸

Goldsmith's own acknowledgments are not to be trusted. Goldsmith apparently deliberately refrained from referring very often to Brookes, *British Zoölogy*, or Pluche, three main sources, while he deliberately mentions as often as possible the names of scientists like Boyle, Gesner, and Linnaeus. Pluche is not mentioned as often as Boyle is, although one selected borrowing from Pluche is longer than all the borrowings from Boyle. Goldsmith's motives were probably two. By referring often to learned names, he gives a scientific air to *Animated Nature*, and he avoids acknowledging the extensive use to which he put Pennant, Pluche, and Brookes.

The main sources, as set forth in this essay, are not only supported by verified passages, which indicate the extent to which Goldsmith used them. They are also more probable as main sources than are highly technical or purely scientific works. Because Goldsmith was writing a popular natural history, he could make only occasional use of highly technical works. It is true that he used Swammerdam as a source (although not as a major

smith's and the quadrupeds are discussed in the same order. Brookes, it is true, devotes three successive chapters, II, III, and IV to the Cow Kind, number two on Goldsmith's list, but this does not in any way interrupt the order of the list. Brookes also discusses in one chapter, XVI, the last three quadrupeds on Goldsmith's list, the hare, the rat, and the hedgehog. But this, too, does not in any way alter the arrangement.

The organic plan for Goldsmith's *Animated Nature* was the principles of the chain of being. He fits his creatures into a detailed chain. Apparently Goldsmith saw in Chapters I-XVI of Brookes a list of quadrupeds which would fit well into his own plan. There are rough similarities also between Brookes' organization of birds as shown in the table of contents of Volume II of his work and the listing and divisions of Goldsmith. It must be remembered that Goldsmith subordinates all such listing to his own plan, that of the chain of being. But this comparison with Brookes merely gives additional proof that Goldsmith was well acquainted with this major source.

³⁸ Pitman, *op. cit.*, pp. 18-19.

source), but he gravitated not toward the technical *Historia Insectorum Generalis*,³⁹ but toward the livelier *Biblia Naturae*,⁴⁰ whose enthusiasm for the argument from design makes the account vivid and exciting.

Brisson, Ray, and Linnaeus are also learned scientists whose technical and minutely classified works could not offer Goldsmith a great deal. The *Ornithologie* of Brisson, for example, is an impressive work in six volumes, devoted to classifications of order, genus, species, etc., and to minute anatomical descriptions. As I have indicated earlier, Pitman states that Brisson was a main source of Goldsmith's knowledge of birds. I have been able to

³⁹ My verified borrowings from this work are the following:

<i>Animated Nature</i>	<i>Histoire Générale des Insectes</i> Utrecht, 1862.
The admiration of small animals, VII, 233-34	pp. 1-4
Four orders of insects, VII, 241-44	Appendix giving the classification
The louse, VII, 271	p. 67
The Monoculus, VII, Chapter VIII, 288-90	pp. 69-74
The scorpion, VII, 292-93	p. 154

⁴⁰ Goldsmith used a translation. In the following edition which I used, the reference in *Animated Nature*, VII, 357, to Swammerdam, p. 114, checks. The title reads: Jean Swammerdam, *The Book of Nature; or The History of Insects . . . with The Life of the Author, by Herman Boerhaave, M. D.* Translated from the Dutch and Latin original Edition, by Thomas Flloyd. Revised and improved by notes from Réaumur and others, by John Hill, M. D. London, 1758.

<i>Animated Nature</i>	<i>The Book of Nature</i>
Shell of snail, VII, 4	Part I, pp. 64-65
Reproduction of snail, VII, 21-22	Part I, pp. 58-59
An experiment, VII, 24	Part I, p. 66
Snails in water, VII, 28-29	Part I, p. 74
Reproduction of snails, VII, 29-30	Part I, p. 79
Dragonflies, VII, 318-20	Part I, pp. 98-99
Earwig seeming destitute of wings, VII, 357.	Part I, p. 114
Water scorpions, VII, 360	Part I, p. 103
The ephemera, VII, 361	Part I, pp. 103-104
Metamorphosis of ephemera, VII, 362-65	Part I, pp. 105-108
Metamorphosis of ephemera, VII, 365	Part I, p. 114
Metamorphosis of caterpillar, VIII, 27-31	Part II, pp. 19-20

verify only five small borrowings from Brisson, all of them being succinct lists or numberings of species.⁴¹ Not Brisson, but Willughby, Pennant, and Brookes gave Goldsmith his knowledge of birds.

Another example of a technical work which Goldsmith found of little use is George Edwards' *A Natural History of Uncommon Birds, and of Some Other Rare and Undescribed Animals*.⁴² The numerous, large, handsome plates make these interesting volumes. But the text consists solely of anatomical description. Pitman found that Goldsmith referred to Edwards' work only four times⁴³ but concluded that the work was "more important as a source than the number of citations indicates."⁴⁴ I have been able to verify only one first-hand borrowing from Edwards, and that a doubtful one.⁴⁵

Minute scientific classifications, scientific anatomical descriptions were not for Goldsmith. One dull portion of *Animated Nature*⁴⁶ consists of a classification of spinous fish translated literally from Antoine Gouan's *Histoire des Poissons*.⁴⁷ It is unlike the rest of *Animated Nature*. Perhaps Goldsmith was merely filling up space. But the classification was as dull to him as he thought it would be to his readers. And he inserts here and there, wherever he can, an interesting detail to enliven the account. See

⁴¹ The borrowings are as follows:

<i>Animated Nature</i>	Mathurin Jacques Brisson, <i>Ornithologie</i> (6 vols.; Paris, 1760)
Goldsmith's list of rapacious birds, Table of Contents, V	I, 419-526
A list of species of eagle, V, 97-99	I, 419-52
Twenty-eight kinds of cuckoo, V, 268	IV, 104-64
Forty-seven kinds of heron, V, 392	V, Index
Twenty kinds of wild duck, VI, 126	VI, Index

⁴² Four volumes, in two. London, 1743-51.

⁴³ Pitman, *op. cit.*, p. 140.

⁴⁴ *Ibidem*.

⁴⁵ The borrowing is the following:

<i>Animated Nature</i>	<i>A Natural History of Uncommon Birds</i>
The albatross, VI, 59-60	I, Plate 88

⁴⁶ VI, 299-309.

⁴⁷ Strasbourg, 1770. Pp. 102-108.

for example, *Animated Nature*, VI, 300-301, the section on Prickly Finned Jugular Fish, where the material for species 4, 5, 6, and 7 concludes in each case with a detail picked up from *British Zoölogy*, III, 134, 130, 131, and 173 respectively.

II

The complete list of sources of *Animated Nature* given in the appendix to Pitman's study is of questionable value because it contains no verifications of borrowings. For example, Pitman lists William Borlase's *The Natural History of Cornwall*⁴⁸ as a source because in *Animated Nature*, VI, 327, Goldsmith refers to Borlase. And Pitman adds: "Goldsmith quotes at length."⁴⁹ But he does not say where in Borlase the passage occurs. As a matter of fact, Goldsmith probably did not use Borlase directly. *British Zoölogy* quoted the passage from Borlase,⁵⁰ and since Goldsmith was using that work constantly, the greatest probability is that he took the passage second-hand from *British Zoölogy*, one of his major sources.

A list of sources compiled from the acknowledgments of Goldsmith alone would run well into the hundreds. But not every acknowledgment is at first-hand. The process of sorting out first-hand and second-hand references is fairly complicated. In the first place, Goldsmith acknowledges authorities freely. Sometimes his references are accurate. The passage in *Animated Nature*⁵¹ on the parasite ichneumon fly, ascribed to Réaumur, occurs in Réaumur's *Mémoires pour servir à l'Histoire des Insectes*.⁵² Dr. Pitfield's experiment on toads,⁵³ ascribed to *British Zoölogy* occurs in that work.⁵⁴ The description of the Urus or wild bull,⁵⁵ ascribed to Klein, occurs in Jacob Theodore Klein's *Quadrupedum Dispositio Brevisque Historia Naturalis*.⁵⁶

Often, however, in verifying a reference, one discovers that

⁴⁸ Oxford, 1758. See Pitman, *op. cit.*, p. 138.

⁴⁹ *Ibidem*.

⁵⁰ III, 293, 217-18.

⁵¹ VIII, 45-46.

⁵² Paris, 1760. II^a, 213-14.

⁵³ *Animated Nature*, VII, 102-05.

⁵⁴ III, 333 ff.

⁵⁵ *Animated Nature*, III, 16-17.

⁵⁶ Leipzig, 1751. P. 12.

Goldsmith probably used the work at second-hand. I have indicated this practice twice already. But I can mention further that the speculations of Burnet, Whiston, and Woodward concerning the origin of the earth, which Goldsmith rehearses in *Animated Nature*,⁵⁷ were probably translated from Buffon.⁵⁸ Aelian on an erudite elephant,⁵⁹ Kolben on the vulture,⁶⁰ were also probably quoted from Buffon.⁶¹ The long quotation from Dr. John Caius' *De Canibus Britannicus*⁶² probably came from *British Zoölogy*.⁶³

A further complicating factor is that Goldsmith does not always acknowledge his sources. In his account of the cuckoo,⁶⁴ he refers to Réaumur, Willughby, and Brisson. Willughby and Brisson apparently are authentic sources. But the material from Réaumur was probably quoted from Brookes,⁶⁵ and Brookes, to whom Goldsmith owed one-third of the entire borrowing was left unacknowledged. In the description of the condor,⁶⁶ Goldsmith, in the space of four paragraphs, refers to Acosta, Garcilasso, Desmarchais, Condamine, Labat, Mr. Strong and P. Feuillée, leaving unmentioned Buffon and Brookes, from whom he obtained the material.⁶⁷ Furthermore, as I have noted, Goldsmith seldom refers to the works which he used most extensively, with the exception of Buffon.⁶⁸

Until ways of distinguishing Goldsmith's first-hand references from his second-hand references are established, any given reference in *Animated Nature* may be suspected of being second-hand.

The criteria which I used to determine Goldsmith's direct indebtedness are the following:

1. The main scientific sources were established by careful com-

⁵⁷ I, 22-33.

⁵⁸ *Histoire Naturelle*, XXXI, 197-205; 187-93.

⁵⁹ *Animated Nature*, IV, 261.

⁶⁰ *Ibid.*, V, 111.

⁶¹ IV, 242, Latin footnote, and XIII, 185-86, respectively.

⁶² London, 1570. In *Animated Nature*, III, 285-90.

⁶³ I, 49-56.

⁶⁴ *Animated Nature*, V, 265-68.

⁶⁵ *A New and Accurate System of Natural History*, II, 242.

⁶⁶ *Animated Nature*, V, 101-102.

⁶⁷ Buffon, *Histoire Naturelle*, XIII, 190-94, and Brookes, *A New and Accurate System of Natural History*, II, 13-14.

⁶⁸ Some unacknowledged borrowings from Brookes are the following: *Animated Nature*, V, 336-44 and VII, 340-46 from Brookes, II, 237, 275-78 and IV, 63-67, respectively. Pluche's *Nature Delineated*, I, 42-54, is the unacknowledged source of *Animated Nature*, VIII, 51-58.

parison of parallel verbatim passages from Buffon, Brookes, Pennant, Pluche, and Willughby. The quantities of material taken from these writers lift them out as principal sources. A second significant fact is that the first four writers quote freely from many of the sources which Goldsmith acknowledges. Consequently, one can hazard the probability that if Goldsmith's reference to Gesner or Réaumur or Edwards or Burnet or any other source, is *not* quoted first in any of the five major sources, then Goldsmith used the work at first-hand. This process of elimination constitutes only a probability, but a fairly safe one.

2. If the source existed in Goldsmith's library, there is greater probability that Goldsmith used the work at first-hand. This probability is not always a safe guide. Although Pluche and the fifth and sixth volumes of Brookes were in Goldsmith's library, the other main sources, Buffon, Pennant, and Willughby were not.

3. If Goldsmith's page references check, there can be little doubt that he was quoting directly. Goldsmith gives page references in footnotes only rarely. The edition of Boyle which I examined, *The Philosophical Works of the Honourable Robert Boyle, Esq.* (Edited by Peter Shaw, M. D. The second edition corrected. 3 vols. London, 1738), was probably the one which Goldsmith used, for volume and page references check. See for example Goldsmith's ascription of a borrowing in *Animated Nature*, I, 178 to Boyle, I, 610 and another in *Animated Nature*, I, 318, to Boyle, II, 598. Some other page references of Goldsmith's which check are the following:

The reference to p. 114 of Hill's 1758 translation of Swammerdam's *Biblia Naturae*.⁶⁹ In *Animated Nature*, VII, 357.

The reference to the 1749 edition of Linnaeus's *Amoenitates Academicæ* in seven volumes.⁷⁰ In *Animated Nature*, III, 181 to Linnaeus, V, 465.

The references to the three volume edition of Linnaeus's *Systema*, published in 1766-1768.⁷¹ *Animated Nature*, II, 243, to Linnaeus, I, 29 and *Animated Nature*, III, 337 to I, 60.

The references to the abridged *Philosophical Transactions*.⁷² *Animated Nature*, I, 43 to *Philosophical Transactions*, II, 427, of the abridged edition by John Lawthorp, London, 1705 and *Animated Nature*, I, 44 to the same II, 426.

⁶⁹ See above, p. 41, and footnote 40.

⁷⁰ For the complete bibliographical title, see below, p. 47.

⁷¹ For the complete bibliographical title, see below, p. 47.

⁷² For the complete bibliographical title, see below, p. 47.

Checking page references is a fairly conclusive but not an extensive guide, for such references do not occur very often.

On the basis of such criteria, I have verified as first-hand references a list of scientific authors. The list might begin with two important scientific sources which Pitman did not discover or identify. One of these is the *Encyclopédie*.⁷³ The other is a German scientific periodical which Goldsmith refers to as "Ephemerides" or "The German Ephemerides," but which Pitman could not identify.⁷⁴ Goldsmith's library contained nineteen volumes of this German periodical,⁷⁵ the full title of which is as follows: *Miscellanea Curiosa Medico-Physica Academiae Naturae Curiosorum sive Ephemeridum Medico-Physicarum Germanicarum Curiosarum*. Written in Latin and published in Leipzig in thirty volumes from 1670 to 1706, the *Miscellanea* was a seventeenth century publication of a German society of physicians. The *Miscellanea* corresponds to the *Philosophical Transactions of the Royal Society*. Membership in the German society was determined largely by the publication of a scientific paper containing the original research of the member.⁷⁶ The journal ranked high at the end of the seventeenth century and was quoted by the *Philosophical Transactions of the Royal Society*, by the *Journal des Sçavans* and by Bayle in *Nouvelles de la république des lettres*.⁷⁷

The following list of scientific authors to whom Goldsmith was directly indebted does not include the five main sources, Buffon, Brookes, Pennant, Willughby, and Pluche. Starred works in the list were in Goldsmith's library. Space in this essay does not permit such verification of passages as I have given in the ap-

⁷³ Goldsmith's use of the *Encyclopédie* as a source for writings other than *Animated Nature* was established jointly by Mr. R. S. Crane and Mr. Arthur Friedman in an article, "Goldsmith and the *Encyclopédie*," *Times Literary Supplement*, May 11, 1933, p. 331. Mr. J. E. Brown indicated Goldsmith's indebtedness to the *Encyclopédie* in an earlier article, "Goldsmith's Indebtedness to Voltaire and Justus Van Effen," *Modern Philology*, XXIII (1926), 273-84.

⁷⁴ Pitman lists "The German Ephemerides" in his list of "Miscellaneous Unidentified References" in the appendix to his study. See Pitman, *op. cit.*, p. 149.

⁷⁵ See the catalogue of Goldsmith's library in Prior, *Life*, Appendix II, 582.

⁷⁶ Martha Ornstein, *The Role of Scientific Societies in the Seventeenth Century*. (University of Chicago Press, 1928), p. 169.

⁷⁷ *Ibid.*, p. 174.

pendix for four main sources. Nevertheless all but six of the following authors, Ellis, de Geer, Gesner, Ray, Redi, and Seba, have had one passage or more verified within the text or notes of the present essay. I believe that on the whole the list represents men whose object was purely scientific.

Boyle, Robert. *The Philosophical Works of the Honourable Robert Boyle, Esq.* Edited by Peter Shaw, M.D. The second edition corrected. 3 vols. London, 1738.

Brisson, Mathurin Jaques. *Ornithologie*. 6 vols. Paris, 1760.

Dézallier d'Argenville, Antoine Joseph. *L'Histoire Naturelle Éclaircie dans une de ses parties principales, la Conchyliologie, . . . augmenté de la Zoomorphose*. Paris, 1757.

Edwards, George. *A Natural History of Uncommon Birds, and of Some Other Rare and Undescribed Animals*. 4 vols. in 2. London, 1743-51.

———. *Gleanings of Natural History*. 3 vols. London, 1758.

Ellis, John. *An Essay Towards A Natural History of the Corallines*. London, 1755.

* de Geer, Charles. *Mémoires pour Servir à l'Histoire des Insectes*. 7 vols. in 9. Stockholm, 1752-78.

* Gesner, Konrad von. *Historia Animalium*. 5 vols. in 3. Frankfort, 1585-87.

* Gouan, Antoine. *Histoire des Poissons*. Strasbourg, 1770.

* *Histoire de l'Académie Royale des Sciences*. 1699- Paris, 1732.

Klein, Jacob Theodore. *Quadrupedum Dispositio Brevisque Historia Naturalis*. Leipzig, 1751.

———. *Historia Avium Prodomus cum Praefatione de Ordine Animalium in Genere*. Lubica, 1750.

* Linnaeus, Carolus (Karl von Linné). *Amoenitates Academicæ Seu Dissertationes Variæ Physicæ, Medicæ, Botanicæ*. 7 vols. Leyden, 1749.

* ———. *Fauna Suecica Sistens Animalia Suecicæ Regni*. Stockholm, 1761.

* ———. *Systema Naturæ per Regna Triâ Naturæ*. 3 vols. in 4. Stockholm, 1766-68.

* *The Philosophical Transactions and Collections, To the End of the Year 1700. Abridg'd and Disposed under General Heads*. Edited by John Lawthorp, M. A., and F. R. S. 3 vols. London, 1705.

———, (*From the Year 1700 to the Year 1720*). *Abridg'd and Disposed under General Heads*. Edited by Henry Jones, M. A. and Fellow of King's College, in Cambridge. 2 vols. London, 1731.

———, (*From the Year 1719 to the Year 1733*). *Abridged and Disposed under General Heads*. Edited by Mr. John Eames, F. R. S. and John Martyn, F. R. S. 2 vols. London, 1734.

Ray, John. *Synopsis Methodica Animalium Quadrupedum et Serpentinum Generis*. London, 1693.

- Réaumur, René de. *Mémoires pour servir à l'Histoire des Insects*. 6 vols., 2 parts each. Amsterdam, 1737-48.
- Redi, Francisci. *Experimenta circa res diversas naturales, speciatim illas, Quae ex Indiis adferuntur*. Amsterdam, 1675.
- Seba, Albert. *Locupletissimi Rerum Naturalium Thesauri*. 4 vols. Amsterdam, 1734-65.
- Swammerdam, Jean. *Histoire Generale des Insectes*. Utrecht, 1862.
- . *The Book of Nature; or The History of Insects . . . with the Life of the Author, by Herman Boerhaave, M.D.* Translated from the Dutch and Latin original Edition, by Thomas Filloyd. Revised and improved by notes from Réaumur and others, by John Hill, M.D. London, 1758.
- Trembley, Abraham. *Mémoires pour servir à l'histoire d'un genre de polypes d'eau douce, a bras en forme de corne*. 2 vols. Paris, 1744.

III

So far this essay has presented only the negative side of Goldsmith as a popularizer of natural history. He was not a responsible handler of sources and he did not use learned scientific works as his chief scientific sources. But there is positive evidence to show that Goldsmith was a skillful and conscientious compiler and that he had a varied knowledge of the eminent scientific works available in his day.

The five popular sources, including Buffon, which he uses extensively do not account for all of the information which Goldsmith secured for *Animated Nature*. The list of scientific works given above as sources shows that he was familiar with and used to some extent the most important scientific material at his command. This material was of two kinds, learned scientific journals, and the works of great scientists. It is an important fact that he used such writers as Boyle, Brisson, D'Argenville, Edwards, Ellis, Gouan, Klein, Linnaeus, Ray, Réaumur, Swammerdam, and Trembley. He may not have used these writers extensively, but he knew them.

Goldsmith's library contained a large number of volumes of the transactions of three learned scientific societies of his day, French, German, and English. He apparently had a fifteen volume set (with the eleventh volume missing) of the *Histoire de l'Académie Royale des Sciences*.⁷⁸ He had three volumes of the unabridged

⁷⁸ See the catalogue of Goldsmith's library in Prior, *Life*, Appendix, II, 583.

Philosophical Transactions of the Royal Society and five volumes of the abridged sets.⁷⁹ His library also contained nineteen volumes of the German *Miscellanea*, mentioned earlier. He used all three of these scientific journals.

Much of *Animated Nature*, then, is based upon the best scientific material Goldsmith found available for his purposes. If he turned to Brookes, Pennant, and Pluche for material on insects, he also used what he could from the works of scientists like Réaumur, Swammerdam, and Trembley.⁸⁰ Not Brookes and Pennant alone, but also D'Argenville, Gouan, and the *Histoire de L'Académie Royale des Sciences* supplied him with material on fish.⁸¹ He could have obtained an account of the Cock of the Wood from Buffon; instead he turned to the *Journal Oeconomique*, Paris, 1753.⁸²

⁷⁹ *Ibid.*, p. 582.

⁸⁰ See, for example, such borrowings as the following. Complete bibliographical titles of the sources have been given above, pp. 47-48.

<i>Animated Nature</i>	Réaumur, <i>Mémoires</i>
The enemies of the caterpillar, VIII, chapter 4, 43-48	II ² , 201-68 (the direct quotation in <i>Animated Nature</i> , VIII, 45-46, occurs in the <i>Mémoires</i> , II ² , 213-14)
<i>Animated Nature</i>	Swammerdam, <i>The Book of Nature</i> ,
Metamorphosis of caterpillar, VIII, 27-31	Part II, pp. 19-20
<i>Animated Nature</i>	Trembley, <i>Mémoires</i>
The polypus, VIII, chapter 4, 179-91, greatly condensed.	The two volumes
⁸¹ See, for example, the following. For complete bibliographical titles of the sources, see above, pp. 47-48.	
<i>Animated Nature</i>	D'Argenville, <i>L'Histoire Naturelle</i> ,
Nautilus, VII, 36-37	Partie II, 27-30, and Partie I, 199-200
<i>Animated Nature</i>	Gouan, <i>Histoire des Poissons</i> , pp.
Spinous fish, VI, 299-309	102-108
<i>Animated Nature</i>	<i>Histoire de L'Académie Royale</i> ,
The mussel, VII, 42-44	Année 1710, pp. 408-26 (Paris, 1732)
⁸² The verification is as follows:	
<i>Animated Nature</i>	<i>Journal Oeconomique</i> , Paris, 1753,
The Cock of the Wood, V, 200-205	Tome II, Avril, 1753, pp. 49-55
Pitman did not discover this source.	

Considering the mass of material at Goldsmith's command, and considering the length of *Animated Nature*, Goldsmith is a skillful compiler. This fact becomes particularly apparent when one studies his organization, based upon the chain of being, and realizes that he welded his material into a unity which is his own. Although there is evidence that he often plagiarized carelessly and borrowed hastily, there is also evidence to show that he worked hard and was not a slavish translator and compiler.

At the time that Goldsmith wrote his history, Abraham Trembley's work, *Mémoires pour servir à l'histoire d'un genre de polypes d'eau douce, à bras en forme de corne*, published in two volumes in 1744, was the authoritative source on the life and habits of the polypus, particularly of the remarkable propagation of the polypus by cutting. In Volume VIII, 179-91, Goldsmith condensed the entire two volumes on the polypus into a single chapter. He avoided the minutiae of Trembley's experiments, although the experiments had to be followed in order to understand Trembley's conclusions. Occasionally, a paragraph is a fairly direct translation. For example, the paragraph beginning "When several polypi happen to fall" up to "the original cause of contention" (*Animated Nature*, VIII, 186-87), is a translation of Trembley, I, 234-35. But more often, the material is scattered throughout Trembley. For three paragraphs in *Animated Nature*, VIII, 183-84, beginning "These animals have a progressive motion," the references from Trembley run consecutively, I, 69-70, 75-76, 90-91, 137, 232-33, 101, 103, 112.

Goldsmith likewise expended a great deal of effort in abridging from Réaumur. Réaumur's *Mémoires pour servir à l'Histoire des Insectes*, in the 1737 edition, consisted of twelve volumes, numbered as six volumes of two parts each. Réaumur, like Trembley, is discursive and filled with minute details of experimentation. The work which Goldsmith did on Réaumur can be best shown by tracing his handling of his sources on the transformation of the caterpillar into a butterfly or moth, *Animated Nature*, VIII, 11-18. The first eight lines of the paragraph beginning, "The body of the caterpillar . . ." are taken verbatim from Brookes, *A New and Accurate System of Natural History*, IV, 194-95. Then Goldsmith dips into Réaumur, I¹, 13, 152 for the rest of the details on page 11. The remainder of the paragraph on page 12 is from Réaumur, I¹, 153, and 155-56. Continuing the thread of the discourse, Goldsmith

at the bottom of page 12 turns again to Brookes, IV, 195 for the three opening sentences of the paragraph. The next paragraph on page 13, beginning "Caterpillars, in general, . . ." is taken verbatim from Brookes, IV, 195, for two sentences. Then, for more detailed discussion, Goldsmith goes back to Réaumur, and the sources for the next few pages run as follows:

<i>Animated Nature</i>	Réaumur
VIII, 13	I ¹ , 160-163
VIII, 14	I ¹ , 164, 167, 176
VIII, 15	I ¹ , 183-84
VIII, 19-20	I ² , 57-60

Apparently in this section from *Animated Nature*, VIII, 11-20, Goldsmith used the simple narrative of Brookes as a guide for the discussion of the metamorphosis of the caterpillar. But conscientious motives impelled him to turn to Réaumur for a scientific exposition of the process, although this meant searching through at least two volumes.

Because Goldsmith thus condenses and combines his sources, *Animated Nature* becomes a real compilation, at least in the second half, where he ceases to depend upon Buffon. Usually several authorities may be cited for individual chapters. For example, the chapter on "The Eagle and Its Affinities" (V, 88-99), is compiled as follows:

"This fierce animal" to "by an eagle to heaven," pp. 88-91	Buffon, <i>Histoire Naturelle</i> , XIII, 80-82
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"An instance is recorded" to without any sustenance whatever," pp. 91-94	<i>British Zoölogy</i> , I, 123-25
--	------------------------------------

"Such are the general" to "Leaden Eagle," p. 95	<i>British Zoölogy</i> , I, 128-29
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"Nor is the Bald Eagle" to "which is intolerable," p. 96	Brookes, <i>A New and Accurate System of Natural History</i> , II, 12-13
--	--

"The golden eagle" to the end of the chapter, pp. 97-99	Brisson, <i>Ornithologie</i> , I, 419-52
---	--

But even in Volume I, where Goldsmith is very dependent upon Buffon, there are examples of chapters which are real compilations. The chapter on "Fossil-Shells and other Extraneous Fossils" (I, 39-43), is compiled from four sources as follows:

- "Whatever depths of the earth" to "these shells from decay," pp. 40-41 Woodward, *Essay toward a Natural History of the Earth*, p. 16
- "As we find that" to "terrestrial substances," p. 41 *Philosophical Transactions* (abridged set), II, 426
- "With this plausible solution" to "natural element upon land," pp. 41-42 Woodward, *op. cit.*, pp. 22-23
- "As this naturally gave rise" to "idea of their numbers," p. 42 Buffon, *Histoire Naturelle*, XXXI, 306
- "At Touraine, in France" to "portion of earth between them," pp. 42-43 Buffon, *Histoire Naturelle*, XXXI, 290-93
- "Near Reading" to "about two feet thickness," p. 43 *Philosophical Transactions* (abridged set), II, 427
- "About a quarter" to "upon the fingers," p. 44 *Philosophical Transactions* (abridged set), II, 426
- "In several parts of" to "be perfectly discerned," p. 45 Buffon, *Histoire Naturelle*, XXXI, 304
- "The variety of their kinds" to "Orthoceratites," pp. 45-47 Hill, *General Natural History*, I, 641-54

Buffon's *Histoire Naturelle* is the source for about one-third of the information in *Animated Nature*. For the scientific information in the other two-thirds of *Animated Nature* Goldsmith seems to have turned habitually to the four main sources which I have presented in this essay. But these five sources do not account for all of the details in his natural history. There is evidence to show that Goldsmith was a conscientious compiler. His work is not a "steal" from five "popular" sources. He seems also to have had a varied knowledge of purely scientific works, and to have used these works whenever the aim of his natural history permitted.

APPENDIX

Brookes, R., M.D. *A New and Accurate System of Natural History*. 6 vols. London, 1763.

As can be seen from the borrowings, Goldsmith transferred to *Animated Nature* a great part of the Introductions to the volumes of Brookes, Introductions which he himself had written.

Animated Nature

Generation, II, 16-19
 Quadrapeds, II, 309-10
 Quadrapeds, II, 314-40
 Birds, V, 2-3
 Birds' feathers, V, 5
 Birds' wings, V, 8-9
 Birds' legs and bones, V, 12
 Granivorous birds, V, 15-16
 Birds, V, 25-26
 Birds, V, 26
 Fish, VI, 150-51
 Fish, VI, 154-55
 Fish, VI, 163-64
 Fish, VI, 165
 Fish, VI, 172
 Fish, VI, 175
 Spawn of fish, VI, 176
 Young fish, VI, 176-77

Animated Nature

The elk, III, 142-44
 The anatomy of the lion, III, 220-21
 The tiger, III, 240-41
 The anatomy of the Opossum, IV, 242-43
 The anatomy of the crocodile, VII, 120-25
 The Flying Lizard, VII, 156-57
 The cameleon, VII, 151-54
 The ostrich, V, 49-53
 The Bald Eagle, V, 96
 The condor, V, 101-102
 The Golden Vulture, V, 108
 The woodpecker's bill, V, 251
 The woodpecker and ants, V, 252
 Food of cuckoos, V, 265-66
 The nightingale, V, 336-38
 The humming-bird, V, 356-57
 The canary, V, 340-44
 The head and teeth of the shark, VI,
 234-35
 The Hippocampus, VI, 284-85
 The violet crab, VI, 364-68
 The Soldier crab, VI, 370-73
 Serpents without venom, VII, 222-28
 The tarantula, VII, 265-66
 The flea, VII, 268-69
 The louse, VII, 276-80

Introductions to Brookes

I, xl-xli
 I, xxv
 I, xxv-xxix
 II, xi
 II, xii-xiii
 II, xiii
 II, xvi and xiii
 II, xv
 II, xviii-xix
 II, xix
 III, xii
 III, xiii
 III, xv-xvi
 III, xiv
 III, xiii
 III, xvii
 III, xviii
 III, xviii

Brookes, *Natural History*

I, 66-67
 I, 174-76
 I, 180-81
 I, 246
 I, 333-38
 I, 360
 I, 361-63
 II, 77-82
 II, 12-13
 II, 13-14
 II, 17
 II, 108-109
 II, 109
 II, 42-43
 II, 237-38
 II, 245-46
 II, 275-78
 III, 28-29
 III, 72-73
 III, 245-48
 III, 249-50
 III, 356-73
 IV, 251-53
 IV, 272
 IV, 282-87

<i>Animated Nature</i>	Brookes, <i>Natural History</i>
The scolopendra, VII, 302-303	IV, 266; 268-69
The locust, VII, 340-41	IV, 63
The visitation of the locust, VII, 344-46	IV, 65-67
The locust, VII, 347	IV, 64
The locust, VII, 348	IV, 65
The may-bug, VIII, 136	IV, 23-24
The beetle, VIII, 137-38	IV, 25
The Elephant-beetle, VIII, 139-40	IV, 8
The cantharis, VIII, 141	IV, 46
The kermes, VIII, 143-44	IV, 81-84
The cochineal, VIII, 145-47	IV, 83-84
The gall-insect, VIII, 148	IV, 85

Pennant, T. *British Zoölogy*. 4 vols. London, 1768-70.

<i>Animated Nature</i>	<i>British Zoölogy</i>
Breed of English horses, II, 367-68	I, 1-7
Breed of English horses, II, 369-70	I, 1-7
The ass, II, 385-86	I, 11-12
Spanish asses, II, 387	I, 14
Woolen manufacture, III, 43-44	I, 22-25
Stag hunting, III, 109-12	I, 34-37
The buck, III, 129-30	I, 37-38
The roe-buck, III, 131-32	I, 39-40
Delicate palate of hog, III, 177	I, 42
The wild boar, III, 180-81	I, 44
The wild cat, III, 207-209	I, 46-48
English dogs, III, 285-90	I, 49-56
The wolf, III, 319-20	I, 61-63
Fox, III, 332	I, 61
The ermine, III, 358-59	I, 85
The destructive polecat, III, 364-65	I, 78
The rabbit, IV, 22	I, 90-92
The Black Water Rat, IV, 71-72	I, 101-102
The mole, IV, 93-96	I, 108-11
The bat, IV, 135-36	I, 115
The seal, IV, 177-78	I, 75
The seal, IV, 179-80	I, 74, 76
The swallow, V, 346-53	II, 242-53
The eagle, V, 87-88	I, 122-23
The peacock, V, 171-72	I, 211-12
The bustard, V, 194-96	I, 214-16
The magpie, V, 238	I, 171
The Jay, V, 241-42	I, 172-73
The Chatterer, V, 242	I, 174
The pigeon, V, 285-86	I, 216-17
The ring-dove, V, 293-94	I, 221

*Animated Nature**British Zoölogy*

The nightingale, V, 326-27	II, 254-59
The heron, V, 393, 397-98, 400	II, 340-41
The ruff, VI, 34-35	II, 364-65
The grebe, VI, 40-41	II, 394-95
The Cormorant, VI, 64-65	II, 476-77
The gannet, VI, 69-74	II, 479-84
The sea-shore, VI, 78	II, 407-408
The puffin, VI, 102-103	II, 407
The goose, VI, 118-19	II, 447
Feathers, VI, 122-23	II, 448-49
Carp in damp cellar, VI, 314	III, 302
The haddock, VI, 320	III, 146
The herring, VI, 323-24	III, 285-86
The pilchard, VI, 326-28	III, 291-93
The stickle back, VI, 328	III, 217-18
The frog, VII, 75	III, 3
The frog, VII, 83-84	III, 4
The toad, VII, 95-97	III, Appendix, 322-31
Assertion of Bacon and Plot, VII, 101	III, 11
Letter of Bishop Carlisle, VII, 101-105	III, Appendix, 333-38
The viper, VII, 203	III, 17
The Blind Worm, VII, 221-22	III, 25-26

Pluche, Antoine Noel. *Nature Delineated*. Translated by D. Bellamy. 4 vols. London, 1739.

Some of the single borrowings from Pluche are very long. See, for example, the 3rd, 8th, 9th, and 10th.

*Animated Nature**Nature Delineated*

Advantages of mountains, I, 141-42	III, 101
Water mixed with air, I, 368	III, 202-203
The beaver's dam, IV, 161-67	I, 248-52
The turkey hen, V, 181-83	I, 189-90
Web of house-spider, VII, 254-57	I, 63-65
The garden spider, VII, 257-58	I, 66
Gloves from spiders, VII, 262-63	I, 158-59
The lion-ant, VII, 323-30	I, 145-50
The silkworm, VIII, 51-60	I, 42-50
The wasp, VIII, 97-106	I, 78-88
The gnat, VIII, 152-56	I, 134-37
The gall insect, VIII, 148-50	I, 130-32

Willughby, Francis. *Ornithology*. Translated by John Ray. London, 1678.

*Animated Nature**Ornithology*

Anatomy of birds, V, 9-10	p. 1
The ear of birds, V, 11	p. 2

<i>Animated Nature</i>	<i>Ornithology</i>
Internal conformation of birds, V, 13-15	pp. 7-9
Appendix of birds, V, 16-17	pp. 8-9
Internal anatomy of birds, V, 17-18	p. 9
The division of birds, V, 42	p. 20
Size of birds, V, 84	pp. 55-56
The kite, V, 129-30	pp. 74-75
The gos-hawk and sparrow hawk, V, 130-31	p. 69
Poultry, V, 154	p. 154
Hens, V, 165	p. 155
The capon, V, 169-70	p. 156
The partridge, V, 206	p. 168
The partridge, V, 209	p. 168
The quail, V, 212-13	pp. 169-70
Quail, V, 214-15	p. 170
The raven, V, 225-26	p. 122
The rook, V, 230	p. 124
The chough, V, 231	p. 126
The toucan, V, 244-47	pp. 128-29
The wood-pecker, V, 248	p. 134
The rain-fowl, V, 249-51	pp. 135-36
The bird of paradise, V, 257	p. 90
Torpid swallows, V, 267-68	p. 98
Story of parrot, V, 712 [271]	p. 109
The parrot, V, 712 [271]-272	pp. 109-10
The parrot, V, 273	p. 109
The beak and toe of parrot, V, 274	p. 109
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The following sources, listed by Pitman as authentic sources, were probably used at second-hand by Goldsmith.

William Borlase, *The Natural History of Cornwall* (Oxford, 1758). The lengthy quotation, *Animated Nature*, VI, 327-28, comes from *British Zoölogy*, III, 293.

Thomas Burnet, *Telluris Theoria Sacra* (2 vols.; London, 1681-89). The only important reference, *Animated Nature*, I, 22-26, was taken from Buffon, *Histoire Naturelle*, XXXI, 197-200.

Dr. John Caius, *De Canibus Britannicus* (London, 1570). The long quotation, *Animated Nature*, III, 285-90, comes from *British Zoölogy*, I, 49-56.

Mark Catesby, *The Natural History of Carolina, Florida, and the Bahama Islands* (2 vols.; London, 1754). Catesby is quoted by Buffon. See, for example, *Animated Nature*, V, 112, on the vulture, from Buffon, *Histoire Naturelle*, XIII, 187-88.

Benjamin Martin, *Natural History of England* (London, 1759-63). Goldsmith's references are actually from M. Martin, *A Description of the Western Islands of Scotland* (London, 1716). But the references come second-hand through *British Zoölogy*, II, 479-84.

Ambrose Paré, *Medical Works*. Daubenton quotes Paré. See *Animated Nature*, II, 279-82 on mummies, from Daubenton, V, 311-12.

Pitton de Tournefort, *Relation d'un Voyage au Levant* (Paris, 1741). The references come through Buffon. See, for example, the reference to the labyrinth of Candia, in *Animated Nature*, I, 63, from Buffon, *Histoire Naturelle*, XXXII, 265.

William Whiston, *A New Theory of the Earth* (London, 1696). The long quotation on the theory of the formation of the earth, *Animated Nature*, I, 28-31, comes through Buffon, *Histoire Naturelle*, XXXI, 187-91.

John Woodward, *An Essay toward a Natural History of the Earth* (London, 1695). The long quotation on the formation of the earth, *Animated Nature*, I, 26-27, comes through Buffon, *Histoire Naturelle*, XXXI, 202-205. Woodward, however, seems to be responsible for two short passages. See above, p. 52.

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